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(54) **TECHNICAL SUPPORT CHAIN
AUTOMATION WITH GUIDED SELF-HELP
CAPABILITY AND OPTION TO ESCALATE
TO LIVE HELP**

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(58) Field of Search **709/205, 204;**
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30, 46, 47; 707/10; 706/46, 50, 60, 61

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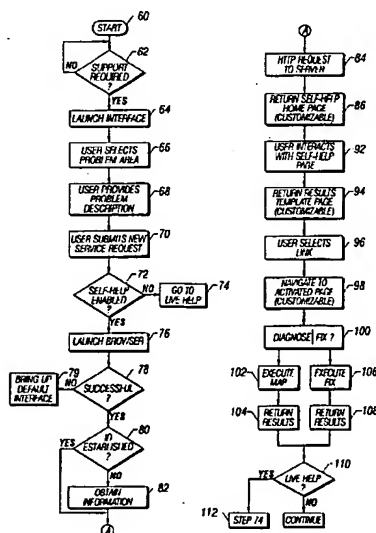
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(57) **ABSTRACT**

A method for automated technical support in a computer network having a client machine, and at least one server from which live help is available. The method begins initiates a guided self-help session in response to entry by a user of a problem area and description. During the self-help session, the user is provided with an option to escalate to live help. If the user exercises that option, the system automatically provides a support engineer at the server with a data stream summarizing the self-help session. During the live help, the support engineer may then repeat a portion of the user's self-help session, view information generated during that session, and/or execute certain actions with respect to the user's machine, all from the engineer's desktop.

29 Claims, 10 Drawing Sheets



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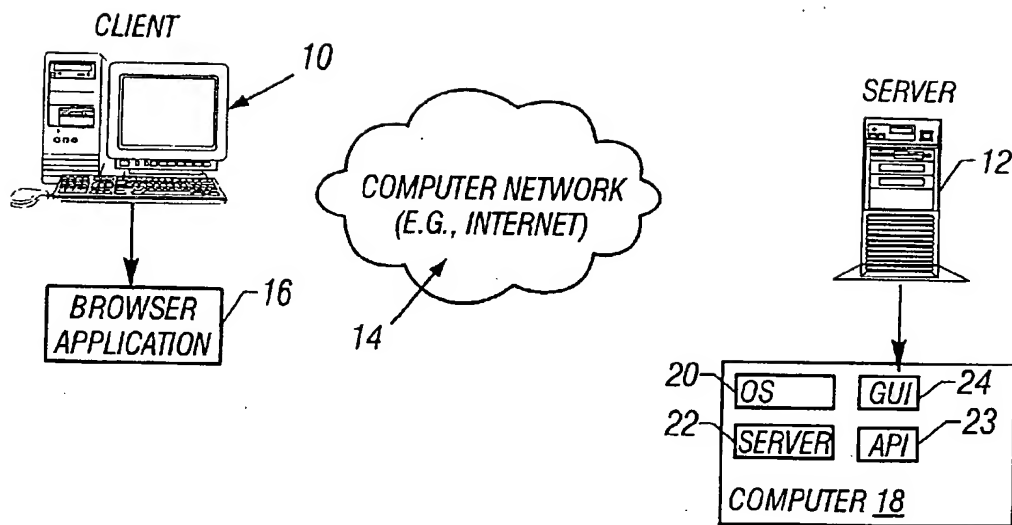
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**FIG. 1**

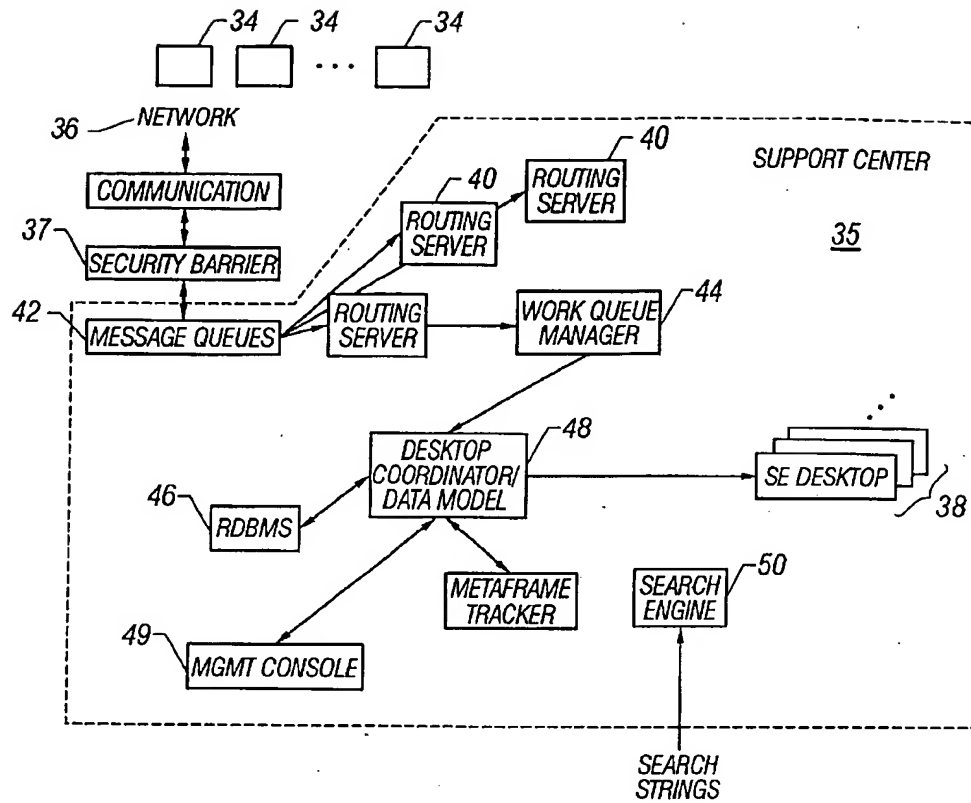


FIG. 2

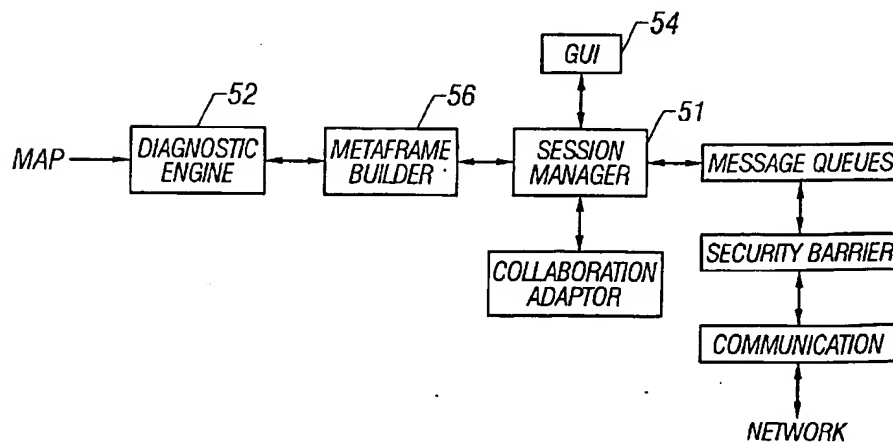


FIG. 3

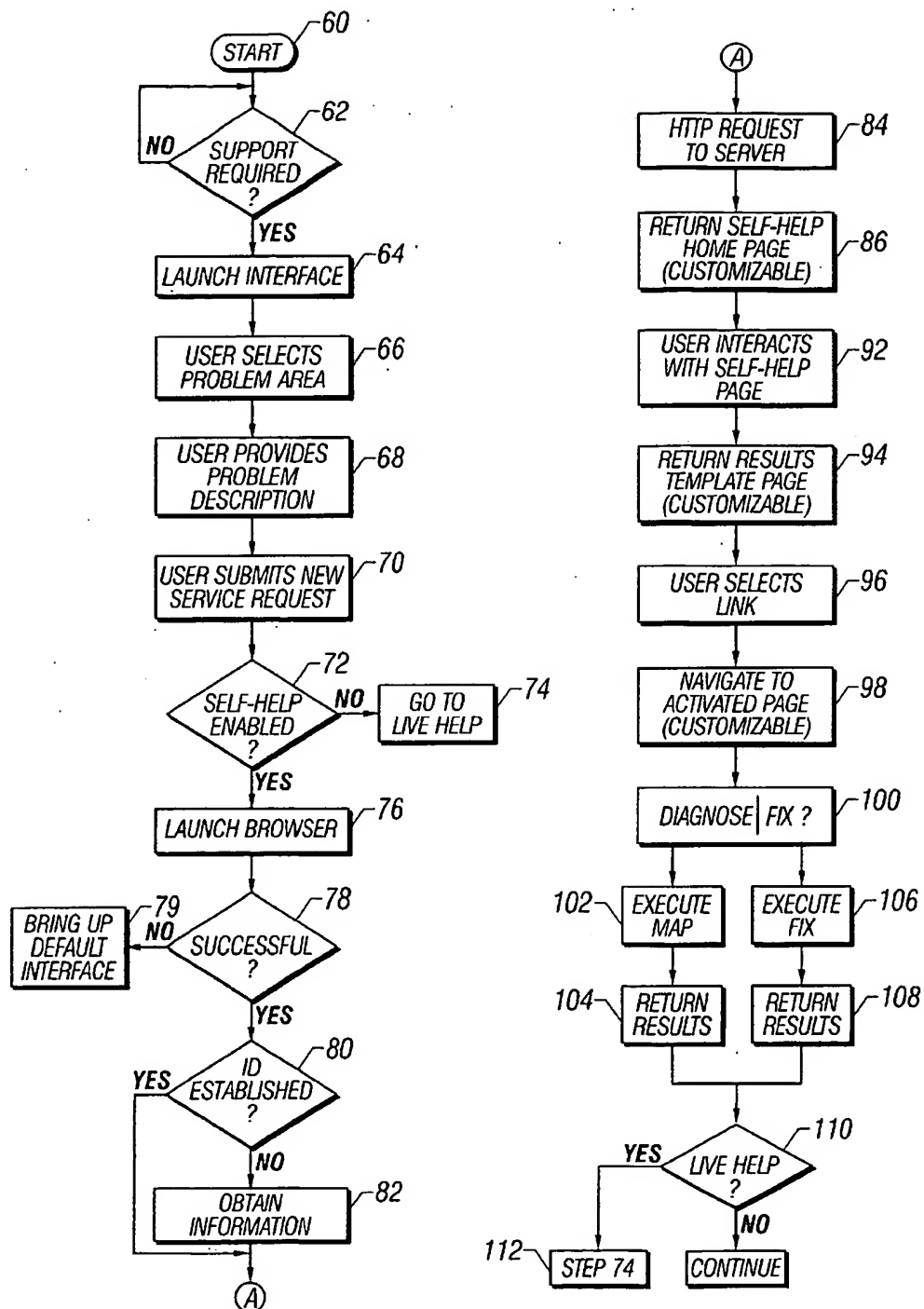


FIG. 4

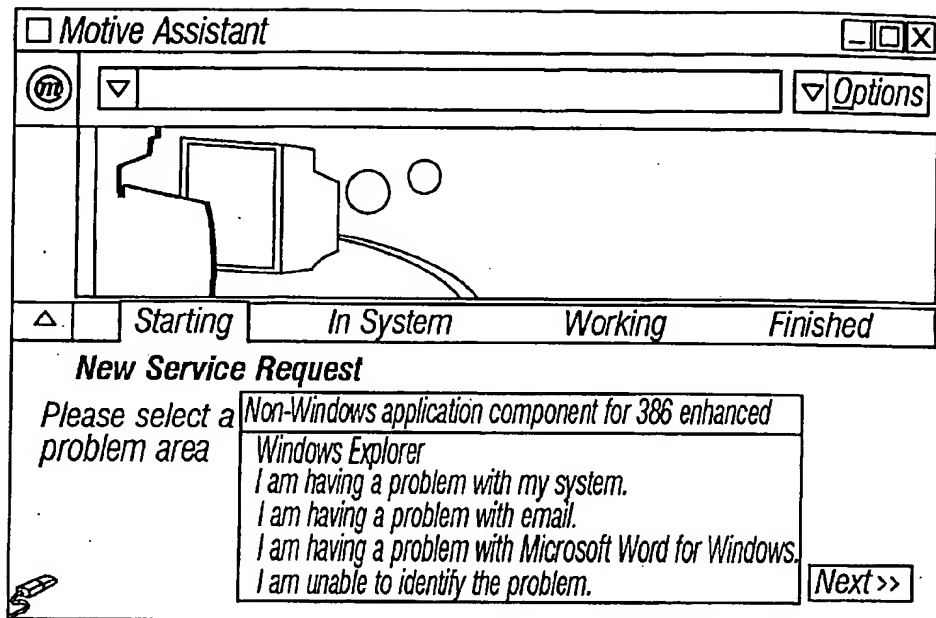


FIG. 5

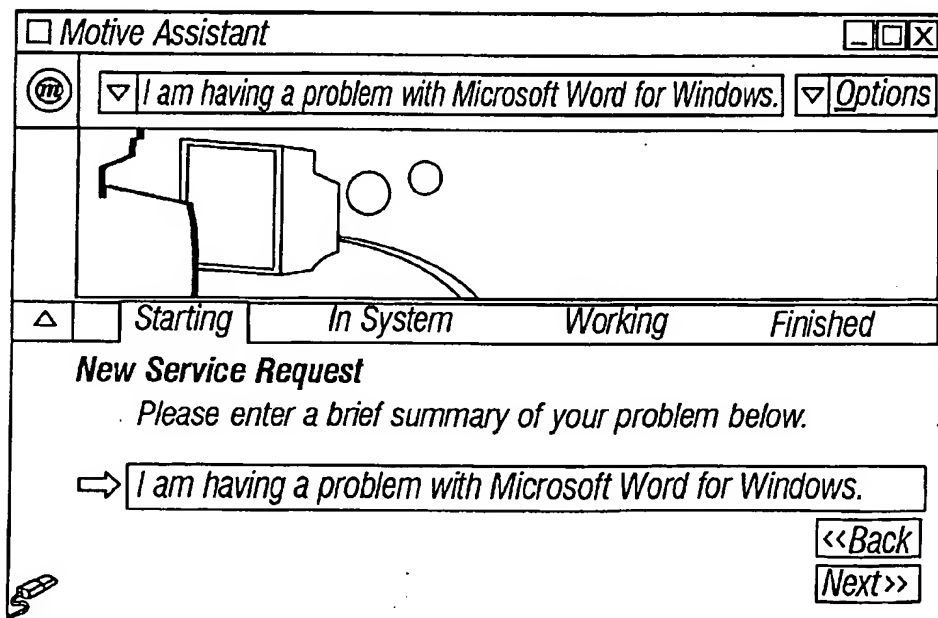


FIG. 6



MOTIVE COMMUNICATIONS
FIRST IN SUPPORT CHAIN AUTOMATION

Enter your query below:

Search String Search

90

88

Tips for searching

☐ Use Free-Text Query.

Alerts and Late-Breaking Information

- ☒ Alert - alert

Current Category: ☐ top

SubCategories:

- ☐ comp
- ☐ jdirect
- ☐ Duke's
- ☐ Bill's
- ☐ Jeremy
- ☐ Mike's
- ☐ sanjay
- ☐ enrico
- ☐ Corey
- ☐ Category
- ☐ testing
- ☐ Self Help
- ☐ This is a test
- ☐ Test Cat
- ☐ Jerry
- ☐ Omar
- ☐ Solaris
- ☐ Outlook Express
- ☐ New Category

Active Content for the Current Category

- ☒ FAQ - nbn
- 91 • ☐ Release Note - Test Release Note
- ☒ Support Note - Guided support for Outlook Express
- ☐ FAQ - New FAQ

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FIG. 7

wwintl32.dll- documents 1 to 1



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Search Results

Documents 1 to 1 of 1 matching the query "wwintl32.dll"

1. Support Note: Wrong Wwintl32.dll Error

Abstract: Wrong Wwintl32.dll Error. Problem. Solution. Support Note.: The information in this article applies to : Microsoft Word 97 for Windows, Service Release 1 (SR-1) SYMPTOMS: When you attempt to start Microsoft Word after you have run the Microsoft Office97 Service Release1 (SR-1) Patch, you may receive the following error message:
size 3,571 bytes- 10/2/98 12:21:04 PM GMT

The index is up-to-date

Page 1 of 1

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FIG. 8

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FIRST IN SUPPORT CHAIN AUTOMATION



Support Note:
Wrong Wwintl32.dll Error

Problem



The information in this article applies to:

- Microsoft Word 97 for Windows, Service Release 1 (SR-1)

SYMPTOMS: When you attempt to start Microsoft Word after you have run the Microsoft Office97 Service Release1 (SR-1) Patch, you may receive the following error message.

The wrong WWINTL32.DLL has been loaded.

CAUSE: This error message occurs when the versions of the Winword.exe file and the Wwintl32.dll file are not the same.

NOTE: It is not sufficient to check the file version information that is displayed when you right-click the program icon and click Properties on the shortcut menu.

This problem may also occur if a wwintl32.dll file is located in the Windows\System directory.

Solution



When you install the SR-1 Patch, the Winword.exe or the Wwintl32.dll files are not properly updated. Select the Motive Fixit icon lower to resolve this problem.

More Background: The following table shows the file size and date of the Winword.exe file installed by Word 97 or the Word 97 SR-1 Patch.

Version	File size	Date
Word 97	5194 KB	11/17/96
Word 97 SR-1 Patch	5200 KB	7/11/97

The default location for the Winword.exe is the C:\Program Files\Microsoft Office\Office folder.

The following table shows the file size, date and location of the Wwintl32.dll file installed by Word 97 and the Word 97 SR-1 Patch.

Version	File size	Date
Word 97	1131 KB	11/17/96
Word 97 SR-1 Patch	1132 KB	7/11/97

The Default location for the Wwintl32.dll file is the following:

C:\Program Files\Microsoft Office\Office

FIG. 9

Motive Self Help Results Page

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**Active Self-Service Results**

You have this problem. The version of the installed library Wwintl32.dll is not correct. Select the fixit diagnostic to resolve this issue.

Related Links

This Motive diagnostic session suggested the following related links:

Main Microsoft Office Site

Related Information

*This Motive diagnostic session suggested some hints that should turn up some relevant related information. Click on the **View Related Information** button if you want to view this related information.*

View Related Information

Need Live Help? *Since answers to many known problems can be found here, we encourage you to continue using our self-service system. However, if you are not able to locate the answer to your problems, and want to work with a live support engineer, click here, and someone will help you as soon as possible.*

FIG. 10

Motive Self Help Results Page

MOTIVE COMMUNICATIONS
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**Active Self-Service Results**

*The version of the installed library Wwintl32.dll has been updated.
You should be able to use Microsoft Word for Windows now.*

Related Links

This Motive diagnostic session suggested the following related links:

[Main Microsoft Office Site](#)

Related Information

*This Motive diagnostic session suggested some hints that should turn up some relevant related information. Click on the **View Related Information** button if you want to view this related information*

[View Related Information](#)

Need Live Help? Since answers to many known problems can be found here, we encourage you to continue using our self-service system. However, if you are not able to locate the answer to your problems, and want to work with a live support engineer, click [here](#), and someone will help you as soon as possible.

FIG. 11

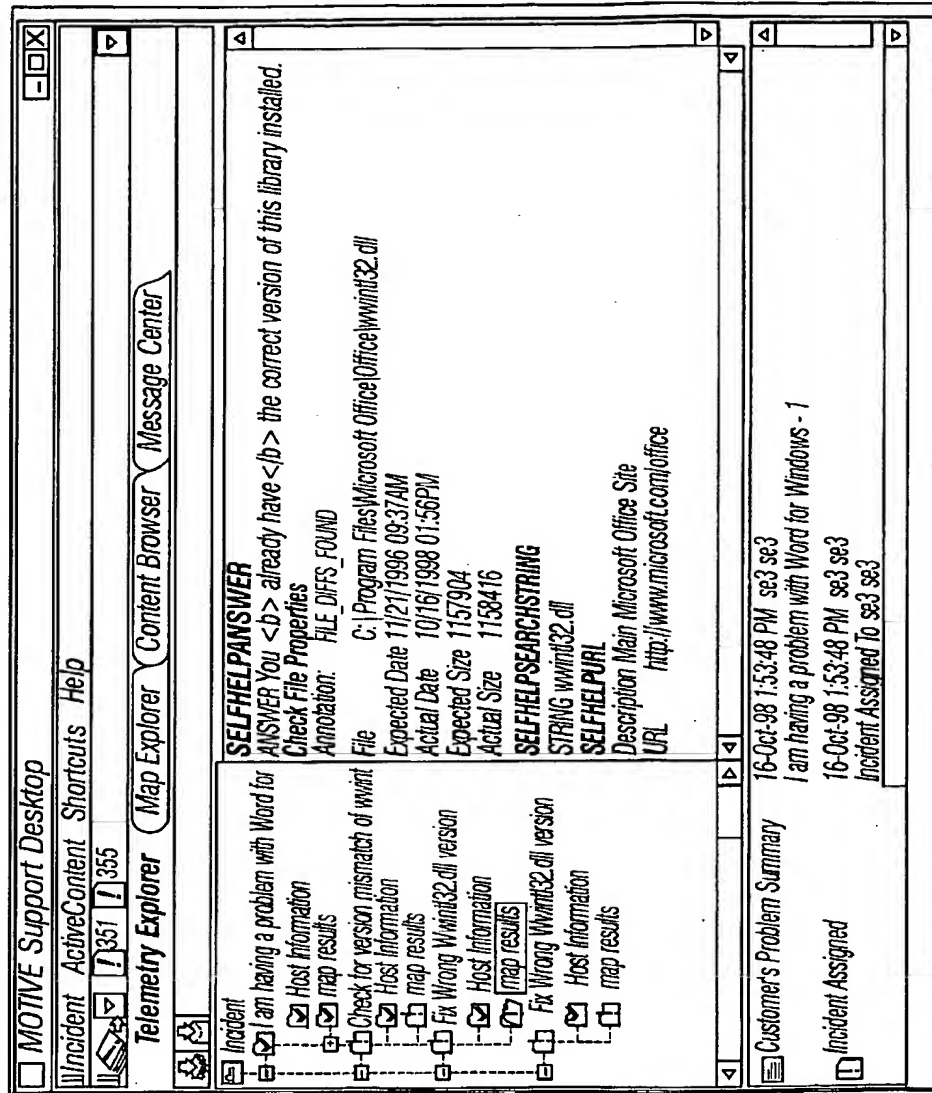


FIG. 12

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TECHNICAL SUPPORT CHAIN AUTOMATION WITH GUIDED SELF-HELP CAPABILITY AND OPTION TO ESCALATE TO LIVE HELP

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BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates generally to automated customer support and service in a distributed computing environment and more particularly to a method of reducing a number of "live" support calls by providing intelligent, guided self-help in such an environment.

2. Description of the Related Art

Technical support services and programs are designed to diagnose and solve hardware or software problems that users and/or customers encounter as they use computers. As businesses continue to move on-line, distributed computing environments become more complex and, thus, more difficult to troubleshoot. Indeed, entire businesses now desire to connect their critical business systems directly to employees, customers, vendors and other important constituencies. To this end, many internal or external business network applications are now being connected to the Internet's World Wide Web to make the information accessible from anywhere using conventional browser software.

Traditional technical support centers place their emphasis on internal tracking and productivity tools, such as problem tracking systems. Such "back end" systems exist internally to the support organization and are usually transparent to the customer. Although back-end systems aid internal efficiency, they do little for the actual problem resolution process itself. Problem resolution is typically left to telephony-based technologies such as agent-based automatic call distribution (ACD) support centers and intelligent voice response (IVR) devices.

Such techniques attempt to diagnose and address problems on a remote node without actually having the technician travel to that node. The most common method of technical support is still a telephone conversation with tech support personnel. Other known techniques involve a network "login" to the remote node so that the conditions may be evaluated from the technical support center's viewpoint. The network connection may be used to run a diagnostic program on the remote node, or "self-help" fix-it programs may be downloaded to the remote node and executed there.

With the explosive growth of the Internet, yet another approach has become quite popular. This approach involves having the user access a Web server with support content in the form of support notes or FAQs. The user attempts to use this information to "self service" his or her own problem. On its face, this strategy appears sensible as, theoretically, an effective self-service strategy would let users solve problems for themselves (e.g., through a Web browser), with the result of lower call volumes and better service. Unfortunately, however, using the Web as a publishing medium has not resulted in the desired benefits. Indeed, call avoidance has often evolved into "customer avoidance". In particular, most normal users do not want to be "detectives" who have to make a set of guesses about the precise search strings that will get them to the right support solutions. Further, it is quite frustrating for users who cannot solve their problems (by self-service) to then be forced to go through the tedious exercise of later repeating to a support engineer information

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concerning their self-service attempts. The result is that end users often feel like their vendor is trying to push them away, with the inevitable result that this unintended result may actually occur.

Indeed, studies have shown that, even when a user knows an answer exists to his or her problem, he or she will be able to find the answer only 40% of the time. Further, many "answers" have very complex diagnoses and resolutions that are well beyond the capabilities of most computer users.

The present invention addresses this problem.

BRIEF SUMMARY OF THE INVENTION

It is a primary object of this invention to provide dynamic, guided self-help in a technical support chain automation system. "Guided" support means the system guides the user to find an answer to his or her technical support question or problem. The approach is "dynamic" because the system preferably refines its suggestions as more data and information is gathered from either the user, the user's system, or from a content database.

It is another primary object of this invention to provide intelligent self-help wherein the system, as opposed to the user, develops the appropriate search strategies to enable the user to be guided to an appropriate subset of relevant support notes. Preferably, these strategies are developed automatically during a self-help session by having the system capture the live context of the user's computer.

It is still another object of this invention to provide an active self-help mechanism by which a user can automate time-consuming self-diagnosis and self-repair tasks. For example, with the present invention, the automated technical support system can automatically check a user's computer to determine whether a specific hardware or software conflict exists and then automatically resolve that conflict, e.g., from a support note.

Yet another object of this invention is to simplify the support process in the situation where the self-help has not succeeded satisfactorily and escalation to a support center is necessary. In this situation, the invention provides a mechanism for transferring (from the user's system to the support center server) information about all user attempts to solve the problem. Thus, when the support problem escalates, the past history of the user's attempts to rectify the problem is immediately visible to the support engineer to provide a valuable head-start in diagnosis and repair, without forcing the user to repeat any steps.

These and other objects of this invention are provided in a method, system and computer program product for automated technical support in a computer network having a client machine and at least one technical support server. When the user desires technical support, a technical support interface is launched. The user is then prompted to select a general problem area. In response to a user query, the system automatically serves a self-help home page (or template) to the user's interface. Preferably, the interface has a Web browser navigation metaphor to provide the user with a comfortable and intuitive interaction with the self-help system.

According to the invention, the self-help home page includes a search field that is populated automatically with a system-supplied, self-help search string. This function obviates the user having to make a set of guesses about the precise search string or strings that will direct the user to the right support solution(s). The search string is a value that, when fed into the technical support server's search engine, should produce relevant hits. In the preferred embodiment,

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the search string is generated dynamically through the use of a diagnostic map that executes on the client machine when the self-help session is initiated. The diagnostic map examines the client system (including the existing applications, registry information and the like) and communicates with the technical support server to derive the search string as a background task. Diagnostic maps are programmable, reusable objects that allow technical support engineers (SEs) and others to write custom tools for diagnosing problems.

If the user elects to execute a search (or, alternatively, a diagnostic map initiates a search automatically), a search results template is returned. If the search returns relevant results, the results template includes a link to a support note. Upon selection of the link, the user is navigated to an "activated" page. The activated page provides the user an option to automatically diagnose the problem (if necessary) and/or the option to fix the problem (if it has been adequately diagnosed and a fix is available). After the user selects the appropriate option, the system returns an active self service results page reporting on the result of the user's action.

Thus, according to an aspect of the present invention, guided self-help is facilitated through use of so-called "active content" pages. Active content is Web-based content (i.e., content viewable by a Web browser) that has one or more diagnostic maps initiated when certain actions are taken (e.g., selecting a link, clicking a button, or the like). In an illustrative embodiment, a given diagnostic map is associated with a page via a URL, although any convenient mechanism may be used to associate a page and a map. When that URL results from selecting a link or button on the Web page, a Web server supporting the support chain automation system has extensions that recognize it as a map (rather than, for example, a reference to another Web page). The active content functionality of the invention enables the user to determine if a particular technical problem described by an external page applies to the user's actual system. This provides a robust self-service capability.

At customizable points during the self-help navigation, the user is given the option to escalate to live-help (e.g. an SE located at the technical support server). When the user selects this option, information about the user's self service efforts is provided to the technical support server automatically so that the user does not need to repeat or otherwise describe to the SE those actions that have already been considered or tried.

When the guided support is complete, whether successful in the first instance or through escalation to live-help, the information about the incident is passed on to the technical support server for reporting and analysis purposes.

During a live help session, the support engineer may access and review the same self-help pages reviewed by the user during the self-help session. The support engineer may also repeat, against the user's machine, all or part of the self-help session to facilitate diagnosis and repair of the technical problem. In this manner, the SE can use the self-help functionality to find a diagnostic map, run a diagnostic map, or point a user to a resource (e.g., a URL) that, upon activation, executes a diagnostic map. Thus, according to this aspect of the invention, the same self-help content (or portions thereof) used to guide the user during the guided self-help session are used at the support center to guide the support technician to a solution from within the context of the technician's desktop.

Thus, according to the present invention, self service is automatic, context-based, intelligent and captures diagnostic information for further use by the technical support center if necessary. The invention also automates self-diagnosis and self-repair.

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The foregoing has outlined some of the more pertinent objects and features of the present invention. These objects should be construed to be merely illustrative of some of the more prominent features and applications of the invention. Many other beneficial results can be attained by applying the disclosed invention in a different manner or modifying the invention as will be described. Accordingly, other objects and a fuller understanding of the invention may be had by referring to the following Detailed Description.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference should be made to the following Detailed Description taken in connection with the accompanying drawings in which:

FIG. 1 is a block diagram of a representative Web client and server network environment in which the present invention may be implemented;

FIG. 2 is a block diagram illustrating the architecture of an technical support chain automation system in which the self-help function of the present invention is implemented;

FIG. 3 is a block diagram of the components of the technical support chain automation system implemented on a client machine;

FIG. 4 is a flowchart illustrating a preferred self-help method of automated technical support according to the present invention;

FIG. 5 is a representative screen display of a self-help interface that is launched to initiate an automated technical support session according to the present invention;

FIG. 6 is a representative screen display panel of the self-help interface;

FIG. 7 is a representative screen display of a self-help home page that is rendered to the user with a system-supplied self-help search string;

FIG. 8 is a representative screen display of a search results template that is generated in response to a user's activation of a search;

FIG. 9 is a representative screen display of an activated page returned in response to a user's selection of a link in the search results template;

FIG. 10 is a representative screen display of an active self-help results page returned in response to the user selecting a Diagnose option in the activated page of FIG. 9;

FIG. 11 is a representative screen display of an active self-help results page returned in response to the user selecting a Fix option in the activated page of FIG. 9; and

FIG. 12 is a representative screen display of a SE desktop illustrating how a Telemetry Explorer dialog panel is used to display information summarizing a self-help session.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is implemented conveniently in an Internet or Web-based computer network, although this is not a requirement. Thus, by way of background, a representative Web client/Web server is illustrated in FIG. 1. In particular, a client machine 10 is connected to a Web server platform 12 via a communication channel 14.

As will be described, the invention assumes that a user of the client machine 10 has experienced a problem that desires automated technical support. According to the invention, the user may attempt to solve the problem through a guided "self-help" process as will be described, or he or she may

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seek "live-help" from a technical support engineer (SE) located at the server platform (or at some other server), or the user may first attempt self-help and then escalate to live-help as needed.

For illustrative purposes, channel 14 is the public Internet, an intranet, an extranet or any other known network connection. Web server platform 12 is one of a plurality of servers which are accessible by clients, one of which is illustrated by machine 10. A representative client machine may include a Web browser 16, which is a known software tool used to access the servers of the network. The Web server platform supports files in the form of hypertext documents, graphics and other data type objects. The network path to a server (or to a file on the server) is identified by a Uniform Resource Locator (URL), and is well-known.

A representative Web Server platform 12 comprises a Compaq® computer 18 running the Windows NT Operating System 20 and a Web server program 22, such as Netscape Enterprise Server Version 3.51, that supports interface extensions. The platform 12 also includes a display supporting a graphical user interface (GUI) 24 for management and administration, and an Application Programming Interface (API) 23 to enable application developers to extend and/or customize the core functionality thereof through software programs such as servlets, CGI scripts, helper programs and plug-ins.

A representative Web client is a personal computer that is x86-, PowerPC®- or RISC-based, that includes an operating system such as Microsoft Windows '95 or NT, as well as a browser, such as Netscape Communicator (any version) or Internet Explorer (any version), having native support for application plug-ins. The Web client machine is connectable to the Web server(s) via the Internet, an intranet or some other computer network. The Web client browser typically includes a Java Virtual Machine (JVM), which provides a convenient runtime environment for programs written as Java applications or applets.

Although not required, the self-help functionality of the present invention is preferably implemented as a Java application or applet (i.e. a set of Java program instructions or code) that is dynamically downloaded to the user's machine for execution. Of course, the inventive self-help application (whether implemented in Java or otherwise) may simply reside on the user's machine. Some of the functionality described herein may be implemented on a server (e.g., as a servlet) and then delivered to the client as needed.

Although the Web client is typically a personal computer, this is not a requirement. The Web client may be any generalized information appliance having a processor, an operating system, optionally a browser application, and a means to connect the device to a computer network from which data may be retrieved. Such appliances include, without limitation, a handheld or palmtop device (e.g., running Windows CE 2.0 or higher), a diskless or so-called "network computer", a set-top computer terminal, or the like.

Although numerous system architectures may be used to implement the inventive technique, one such architecture is illustrated in FIG. 2. This architecture is implemented, for example, in a corporate enterprise environment (such as an intranet), wherein a plurality of client machines (desktops) 34 interface with a support center 35 located at a server node through a network 36. The clients are the desktop machines used by the community of application end users. These are the users who use applications, encounter problems, and seek help. Typically, client machines 34 are separated from

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the network 36 via a firewall 37. Each client machine may include conventional browser software as discussed above. The server node may have associated therewith a set of one or more support engineer (SE) desktops 38 at which technical support personnel reside.

Under certain circumstances as will be described, a user of a given client machine may undertake to solve a particular problem normally requiring technical support through a self-help (or self-service) process. If necessary, the user also may be placed in contact (e.g., via a voice connection over the telephone, through an on-line Web connection, or the like) with a given technical support engineer. Typically, however, such technical support and service is provided in an automated manner, without necessarily connecting the user/customer to a support engineer via an audio or on-line link. In this environment, given interactions between a user (and, in particular, the user's computer) and an SE may occur without the user's actual knowledge or without any direct communication.

The diagnostic center 35 preferably comprises a number of functional components that are now described. The center includes one or more routing servers 40, and each routing server's primary responsibility is to route a given data set to a best-equipped support engineer to handle the call if live-help is required. To this end, information in the data set preferably is matched up against help desk "rules" to determine which group or person should handle the problem. Preferably, the routing server 40 attempts to assign data sets to a most appropriate message queue 42 (and thus, indirectly, to a most appropriate support engineer). Given support engineers preferably belong to a set of "groups," with each having an associated message queue 42 of assigned data sets. A given support engineer obtains ownership of a given data set from his or her respective queue until the session is complete or the call is reassigned to some other group. A work queue manager 44 is responsible for managing the message queues 42.

In addition to performing routing, communications, and data packaging services, the diagnostic center also supports the server portion of the automated support application. The server portion comprises a database server (e.g., a commercially available relational database management system (RDBMS)) 46 and an application server 48. A representative RDBMS is available from Oracle, Microsoft or others. The application server 48 provides a set of services to keep the support engineer desktops up-to-date as well as to provide general services to the application back-end. A given server also has (or has access to) a search engine 50 to facilitate searching for known technical support solutions.

Thus, the diagnostic center routes incoming calls (that require live help) to the best call group queue, provides services to the SE desktops, provides services to the support center management console 49, and interfaces to third party products/systems that store configuration data and track results. The management console is a mission control for support center activities. Preferably, the console 49 has both data display and system configuration capabilities. The data displays are both real-time and historic views into the call center metrics, and the configuration dialogs are used to set operational characteristics of the server. A convenient browser-based or other user interface may be used for this purpose.

A block diagram of the "client" piece of the automated technical support chain automation system is illustrated in FIG. 3. The client piece executes on the client machine 10 (on which the technical problem has arisen) to perform an

initial diagnosis in response to a given occurrence (e.g., a PANIC), to facilitate user self-help. (as will be described), to submit the diagnosis to the diagnostic center, and to collaborate with the server components in the center to perform further tests, preferably in an iterative manner, and, if possible, to make repairs. One such iterative distributed problem solving technique is described in Ser. No. 09/073, 464, titled "Method, System and Computer Program Product For Iterative Distributed Problem Solving," assigned to the assignee of this invention. That application is incorporated herein by reference.

The major client components includes a session manager 51, a diagnostic engine 52 and a graphical user interface (GUI) 54. The session manager 51 takes the initial diagnosis (using a diagnostic map), submits it to the server, tracks open problems, and coordinates the flow of information between the client and the support center. The diagnostic engine is a core piece of code that diagnoses problems and collects data as defined by the diagnostic map(s). It cooperates with a data set builder 56 to create data sets, and it works together with the session manager 51 to forward such data sets to the diagnostic center. The client side GUI 54 may be a simple display icon on the user's desktop that is activated when required by the user seeking technical support. The client GUI 54 may also be used to provide dialog boxes or the like to enable the user to monitor and/or interact during a connection with an SE when live help is required.

In the system illustrated in FIGS. 2-3, all communications are made conveniently over TCP networks, but such communications are not dependent on persistent TCP connections. Instead, a single logical session may span multiple TCP connections. A communications subsystem preferably interfaces the client and diagnostic center, managing the input and output queues, and providing basic network location services. In addition, the system may include a security subsystem as network communications should be secure. Thus, for example, a given data set is preferably sealed to restrict access to the data to those having proper credentials. All operations performed on the, client machine preferably must first pass security conditions to ensure that only support engineers authorized by the client may inspect or change the client.

A simplified flowchart showing the inventive self-help technique is illustrated in FIG. 4. In the illustrative example to follow, it is assumed that the user has tried, unsuccessfully, to launch a Microsoft Word application and, instead, he or she has received an error message (e.g., "wwint132.dll error"). The display of this error message has prompted the user to request technical support.

Several of the steps described and illustrated are provided by way of background or context and should not be taken to limit the invention. The routine begins at step 60. At step 62, a test is run to determine whether the user requires automated technical support. If not, the routine cycles. If, however, the user has indicated his or her request for technical support (e.g., by double clicking an icon in a UI support tray), the routine continues at step 64 to launch the client program code and its associated server interface (sometimes referred to herein as the Motive Assistant™).

This operation brings up a technical support interface such as illustrated in FIG. 5. As can be seen, the interface preferably includes a listbox that includes a list of possible "problem areas" that may be selected by the user for a New Service Request. At step 66, the user selects a problem area. At this point, the user may be prompted to provide a brief

summary of the problem encountered. This is step 68. An illustrative dialog screen for this step is shown in FIG. 6. Thus, in steps 66 and 68, a problem area and description are entered by the user. These steps may be combined. In the illustrative example, the user is having difficulty starting a Microsoft Word application. At step 70, the user submits the New Service Request with the appropriate information.

A test is then performed at step 72 to determine if the self-help function is enabled. If not, the routine branches to step 74 to provide the current problem to the live-help system (namely, an SE). If, however, the self-help function is enabled, the routine continues at step 76. At this time, the user's default Web browser is launched. A Web browser navigation metaphor preferably is used to provide the user with a comfortable and intuitive interaction with the self-help system, although the self-help UI may be system-configurable. At step 78, a test is performed to determine whether the user's browser has launched. If the outcome of the test at step 78 is negative, the routine skips the self-help process and (at step 78) makes the default interface visible for connecting to live-help.

If, however, the outcome of the test at step 78 is positive, the routine continues at step 80 to test whether the user's identity has been established by the automated technical support system. If not, the routine continues at step 82 to obtain the user's contact information to store such information in a registry. Thereafter, or if the outcome of the test at step is positive, the routine continues at step 84.

In particular, an HTTP request is then made to the automated technical support server. Based on the contact information (as well as other basic parameters such as OS type, values entered by the user in problem submission fields, and the like) passed, the routine then continues at step 86 to serve a self-help home page to the user's default browser. A representative self-help home page, based on the Microsoft Word example previously described, is illustrated in FIG. 7. According to a feature of the present invention, the home page includes a search field 88 that is populated automatically, namely, by the system itself, by a self-help search string 90. The home page is displayed as a starting point to enable the user to attempt to solve the problem at hand. As can be seen, the home page may include Alerts and Late Breaking Information, a link to a Current Category that the problem is associated with, and a set of SubCategories, each with appropriate links. The home page may also include links 91 to so-called "active content" for the Current Category comprising FAQs, Release Notes, Support Notes, and the like. These links help the user search the existing knowledge base.

Thus, according to an aspect of the present invention, guided self-help is facilitated through use of so-called "active content" pages. Active content is Web-based content (i.e., content viewable by a Web browser) that has one or more diagnostic maps initiated when certain actions are taken (e.g., selecting a link, clicking a button, or the like). In an illustrative embodiment, a given diagnostic map is associated with a page via a URL, although any convenient mechanism may be used to associate a page and a map. When that URL results from selecting a link or button on the Web page, a Web server supporting the support chain automation system has special extensions that recognize it as a map (rather than, for example, a reference to another Web page). The active content functionality of the invention enables the user to determine if a particular technical problem described by an external page applies to the user's actual system.

Generalizing, regular HTML-based content is sometimes referred to herein as basic content. It may include FAQs, problem/resolution notes, alerts, how to notes, update notes, as well as other types of support information. "Active content" refers generally to basic content that has been activated with an "activator". An activator is an object that adds intelligence to the basic content. An illustrative activator is a diagnostic map. Active content may also be thought of as basic content that has been activated by attaching one or more diagnostic maps to such content.

Thus, there may be several different types (e.g., FAQ, Alert, Note, etc.) of active content. According to the invention, existing Web site information and Web site look and feel may be incorporated into the technical support server by editing a set of default active content related templates, one for each type. Active content may link to other Web-based content via URLs to provide full function multimedia support notes, "how to" information, and the like.

As noted above and as illustrated in FIG. 7, the page is based on the Web browser metaphor and is template-based for ease of configuration. In particular, the diagnostic center may modify the look and feel of the self-help system to match a given theme, layout or motif.

The search string 90 is a value that, when fed into the technical support server's search engine 50, should produce relevant hits, namely, information for solving the technical problem. In the preferred embodiment, the search string is generated dynamically through the use of a diagnostic map that executes on the client machine. The diagnostic map examines the client system (including the existing applications, registry information and the like) and communicates with the technical support server to derive the search string as a background task, namely, without user input. According to the invention, a given diagnostic map is a programmable, reusable object that allows a technical support engineer (SE) or the others to write custom tools for diagnosing problems.

Although not illustrated in FIG. 7, it should be appreciated that, in some instances, execution of a diagnostic map run during the self-help process produces a self-help answer ("you have problem x") or a self-help URL (or series of URLs) that the user should probably investigate. It should also be noted that the notion of a diagnostic map preferably is not surfaced directly to the user. During the execution of a given map, however, the user may be asked if he or she desires to check for a particular problem, apply a patch, or the like).

Returning to FIG. 4, at step 92, the user interacts with the self-help page by navigating the default browser. In this illustrative example, the user launches the search that has been proposed by the system. Alternatively, the system may launch the search automatically for the user. At step 94, the routine returns a results template page that, in this example, identifies a Support Note link. A representative results template page is shown in FIG. 8. In this example, the page identifies a Support Note that describes the user's problem (namely, the inability to start Microsoft Word) and the associated error message that prompted the user to initiate the session in the first instance.

Based on the clear relevance of the Support Note, the user selects the link. This is step 96. Upon activation of the link, the routine continues at step 98 to navigate the browser to a so-called "activated page" as illustrated in FIG. 9. A page is said to be activated because it may include active content. As illustrated, the activated page provides the user an option to

further diagnose the problem, by selecting a Diagnose button, and/or the option to apply a fix to the problem, by selecting a Fix button. Each of these options has associated therewith additional explanatory text to facilitate the user's selection. At step 100, a test is performed to determine whether the user has selected the to Diagnose or to Fix.

The routine branches to step 102 if the user selects Diagnose to execute another diagnostic map. At step 104, the routine then returns and populates a self-help results page such as illustrated in FIG. 10. This page includes appropriate text identifying whether or not the user's system does, in fact, have the problem identified. It may also include related links and information as illustrated. The user may then navigate to the related links and other information.

Alternatively, the routine branches to step 106 if the user selects Fix and executes the required fix. At step 108, the routine returns a self-help results page populated with information confirming the action. Given the previous Microsoft Word example, the self-help results page returned is illustrated in FIG. 11. This page, likewise, may include related links and information.

The self-help results page (in either case) may include a link to live-help. Thus, at step 110, the routine tests to determine whether live-help is requested. If so, the routine branches to step 112 and establishes a live SE connection; otherwise, the routine continues processing the self-help function. This completes the processing.

The technical support system may interact with the user's local machine to execute diagnostic maps using a "mini Web server" process running on the client. Thus, for example, the execute map step 102, among others, may be implemented in this manner. One preferred method for executing a map locally from the client browser begins by sending a special URL to the local mini Web server. The local process authenticates the user, breaks apart the URL to determine which map to run, checks to see if the map is present (and, if not, downloads the map from the system server), "executes" the instructions of the map, collects the resulting XML, and then parses the XML looking for self-service tags to be used for further navigation purposes. Thus, for example, the tags enable the user to navigate to a page that describes the problem or to how to fix the problem. This process is also used to generate the system-supplied search string.

Summarizing, the dynamic search string is built up when the diagnostic map is initially run on the user's system. This string is then fed into the server's search engine, and more relevant search "hits" may result (or, as in the above example, a self-help answer is found). Some of these hits may, in turn, cause other diagnostic maps to run and, in this manner, the user narrows in on the desired solution. Thus, the present invention provides the ability to run a diagnostic map from the client browser during the self-help session, thereby greatly enhancing the user's likelihood of quickly finding the necessary technical solution.

One of ordinary skill will appreciate that by having the system itself create an "expert" search string, the present invention leverages the skill of the original author of the diagnostic map and takes full advantage of the knowledge about the user's then-existing configuration. This provides a local context to the search that provides much more efficient and accurate results, thereby increasing the likelihood of a prompt and successful self-help session.

A diagnostic map run during self-help preferably produces an Extensible Markup Language (XML) metaframe, with sections of the XML filled in with new map APIs:

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SetSelfServiceAnswer;
SetSelfServiceURL; and
SetSelfServiceSearchString,

which contain information to return meaningful information to the user's Web browser. As the names suggest, three different items can be returned as the result of a map being run:

SelfServiceAnswer—this is the answer that the map obtained. For example, "you have problem x";

SelfServiceURL—this is a URL (or series of URL's) that the user should probably investigate;

SelfHelpServiceString—this is a value that, when fed into the search engine, should produce relevant hits. As noted above, the home page template preferably is used to display these results. However, if no SelfServiceAnswer is present in the map results, and only one of the other self-help fields are present, the template step is skipped. For example, if only the SelfHelpSearchString is present, the results of the search will be presented to the end user.

Because the diagnostic map(s) are run from a Web browser, the results are provided as either HTML or as a redirected URL. Preferably, a status bar shows progress while the map is running and, as noted above, a map can optionally interact with the user via map dialog application programming interfaces (APIs).

The present invention has significant advantages. Rather than forcing an end user to be a detective and to enter a series of search strings while attempting to find a solution, the inventive functionality captures the live context of the user's running system and dynamically guides the user to the appropriate subset of relevant active content. Using one or more diagnostic maps, the system performs an electronic diagnosis of the user's system and facilitates further automated technical support. Thus, for example, the inventive functionality may be used to determine automatically whether a support center alert is applicable to the user's individual system, to provide a user with steps and individualized suggestions for accomplishing a specific task (e.g., customized to the user's operating system, version of software, or the like), to perform a sequence of suggestions automatically if the user so chooses, or to perform automatically electronic repairs, or any other set of tasks that would resolve the user's problem. In this manner, the automated technical support functionality electronically and automatically performs the start-to-finish sequence of tasks in a support procedure that were previously performed manually and repetitively.

The self-help function described above provides numerous further advantages. As can be seen, existing Web information can easily be incorporated via links inside the self-help templates. This includes any Web-based content, including multimedia how-to information, and other knowledge bases. Further, at customizable points during the self-help navigation, the user is given the option to escalate to live-help. When this election is made, the default browser is taken down and the default interface obtains focus for live help. In this case, the default browser already has the relevant problem information and, thus, the correct diagnostic map can be run directly. In particular, the problem is sent to the automated technical support server with the original problem description and the self-help map output (which is preferably formatted as XML).

In addition, when the guided support is complete, whether successful (through self-help) or via escalation to live help, the information about the incident is passed on to the server for reporting and analysis purposes. In this self-help case,

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the server preferably stores this information where it can be batch processed into the remainder of the diagnostic center at regular intervals.

Preferably, the client side code manages the guided support experience such that the user is provided a consistent and logical user interface as illustrated above. After using self-help and not having been able to resolve the problem, the user may request live help via the client side code. As noted above, when live help is requested, the incident is sent to the server at this time to be routed to a SE queue. All self-help related information is preferably made available to the router for use in making a routing decision.

Moreover, upon opening an incident report, the telemetry data provided by the client side code summarizes all the self-help actions the user took, including all search strings and those actually traversed. This information is provided preferably in a guided support display group on the SE's desktop. A representative interface illustrating the information is provided in FIG. 12. The system thus automatically provides all relevant self-help information to the SE and makes that information available for display on the SE's desktop. As a result, the user is not forced to repeat to the SE all of his or her self-help actions.

According to another feature of the present invention, during a live help session, the SE may actually access and review the same self-help pages reviewed by the user during the self-help session. The engineer then may also repeat, against the user's machine, all or part of the self-help session to facilitate diagnosis and repair of the technical problem. In this manner, the SE can use the self-help functionality to find a diagnostic map, run a diagnostic map, or point a user to a resource (e.g., a URL) that, upon activation, executes a diagnostic map. Thus, the same self-help content (or portions thereof) used to guide the user during the guided self-help session may be used at the support center to guide the support technician to a solution from within the context of the technician's desktop. This greatly simplifies and reduces the complexity and burden of the live help session.

The present invention facilitates leveraging of common information across all links in the automated technical support chain. This dramatically improves the efficiency of "back-end" processes in the support chain. For example, if a customer is unable to solve a problem through self-help, the automated support chain passes the specific information about the user's attempts to solve his or her problem along with the diagnostic state of the computer into the support center. This gives the next link in the chain a head-start in solving the problem rather than repeating previous steps, which can be time-consuming and frustrating for the customer.

Because all information in the technical support system is integrated along all points in the support chain, operators of the diagnostic center have the means to run much more efficient and effective reports for improved decision-making. For example, if a large amount of requests are made for content from a server, it may make sense to distribute support notes and maps directly out to end users' systems. Further, the operator may be interested in analyzing the effectiveness of self-service relative to automated service. By having an integrated reporting model, it is possible to analyze how early problems are being solved in the support chain and devise strategies to push solutions to earlier (and less expensive) links in the chain through time.

According to the present invention, various types of management reports may be generated for use in analyzing the effectiveness of the guided support process in general, the effectiveness of specific FAQ/resolutions, the effective-

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ness of specific maps, user satisfaction statistics, the self-help to live service info, "how to" versus system problem splits, and the like.

In the prior art, the responsibility of weeding out irrelevant support information is usually given to the end user. When a user is given too many choices, especially ones that do not matter, time is wasted and frustration levels rise. An advantage of the guided self-help functionality of the present invention is the ability to cut through all of the clutter and get to the root cause of the problem. This is accomplished in part by the creation of specific active content support pages into self selecting content. In particular, given logic/assertions may be added to a diagnostic map such that, when that map is executed, an output is provided that is a probability or weight of the relevance of the content page. As the user browses the categories of the active content trees, these logic segments are run dynamically (maybe automatically or by clicking a button) so that relevant content pages are presented.

As an example, assume that certain active content pages are only relevant for Windows NT client systems. The added assertion would be that the current system is that type of system. A much more complex example would involve checking registry values and installed software versions.

As information is provided to the diagnostic center, it is stored in the RDBMS to enlarge the "knowledge base" stored therein. In this manner, specific problems may be useful in generating new diagnostic maps that are then delivered or deliverable to the client machines as the system "grows" in expertise.

Although the various methods described are conveniently implemented in a general purpose computer selectively activated or reconfigured by software, one of ordinary skill in the art would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

As used herein, "Web client" should be broadly construed to mean any computer or component thereof directly or indirectly connected or connectable in any known or later-developed manner to a computer network, such as the Internet. The term "Web server" should also be broadly construed to mean a computer, computer platform, an adjunct to a computer or platform, or any component thereof. Of course, a "client" should be broadly construed to mean one who requests or gets the file, and "server" is the entity which downloads the file. Moreover, although the present invention is described in the context of the Hypertext Markup Language (HTML), those of ordinary skill in the art will appreciate that the invention is applicable to alternative markup languages including, without limitation, SGML (Standard Generalized Markup Language) and XML (Extended Markup Language).

Having thus described our invention, what we claim as new and desire to secure by letters patent is set forth in the following claims.

What is claimed is:

1. A method for automated technical support in a computer network having a client computer system, and a server from which live help is available, comprising:

in response to entry by a user of a description of a problem with the client computer system, initiating a guided self-help session;

executing a diagnostic map on the client computer system;

during the guided self-help session,

using a result of executing the diagnostic map to determine a selection to provide to the user, wherein the server determines the selection,

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providing the selection to the user, and
providing the user with an option to escalate to live help;

if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the guided self-help session.

2. The method as described in claim 1 wherein the data stream includes a search string and results returned from executing the search string.

3. The method as described in claim 2 wherein the search string is a system-supplied string generated in response to entry by the user of description of the problem.

4. The method as described in claim 1 further including the step of saving, in an incident record, information about the guided self-help session.

5. The method as described in claim 4 wherein the information includes results and data gathered by execution on the client computer system of the diagnostic map.

6. The method as described in claim 4 wherein the information includes any URLs selected by the user during the self-help session.

7. The method as described in claim 1 wherein the computer network is the Internet.

8. The method as described in claim 1 wherein the computer network is an intranet.

9. The method as described in claim 1 wherein the client machine includes a Web browser for displaying a Web page to the user during the guided self-help session.

10. The method as described in claim 1 further including the step of having the support engineer repeat a given portion of the guided self-help session from the support engineer's desktop.

11. The method of claim 1, wherein the providing the option to escalate is at customizable points during the guided self-help session.

12. The method of claim 11, wherein when the user selects the option to escalate to live-help, information about the user's self-service efforts is provided to the server automatically.

13. The method of claim 12, wherein the server provides the information about the user's self-service efforts to the support engineer.

14. A method for automated technical support in a computer network having a client computer system, and at least one server from which live help is available from a support engineer, comprising:

in response to entry by a user of a description of a problem with the client computer system, initiating a guided self-help session;

executing a diagnostic map on the client computer system;

during the guided self-help session,

using a result of executing the diagnostic map to determine a selection to provide to the user, wherein the server determines the selection,

providing the selection to the user, and

providing the user with an option to escalate to live help;

if the user exercises the option to escalate to live help, initiating a live help session between the user and the support engineer; and

during the live help session, enabling the support engineer to view information that was available to the user during the guided self-help session.

15. The method as described in claim 14 further including having the support engineer repeat a given portion of the user's guided self-help session from the support engineer's desktop.

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16. The method as described in claim 14 further including having the support engineer cause the execution of the diagnostic map on the client computer system during the live help session.

17. The method as described in claim 14 further including, upon initiation of the live help session, automatically providing the support engineer with a data stream summarizing the self-help session.

18. The method of claim 14, wherein the providing the option to escalate is at customizable points during the guided self-help session.

19. The method of claim 18, wherein when the user selects the option to escalate to live-help, information about the user's self-service efforts is provided to the server automatically.

20. A computer program product in a computer-readable medium for providing technical support chain automation in a computer network having a server and a client computer system, the computer program product executable in the client computer system and comprising:

- means for initiating a guided self-help session;
- means for executing a diagnostic map on the client computer system;
- means for providing a selection to the user;
- means for escalating to a live help session; and
- means for transmitting a data stream to a server, the data stream including information about the guided self-help session.

21. A method for automated technical support in a computer network having a client computer system, and a server from which live help is available, comprising:

- in response to entry by a user of a description of a problem with the client computer system, initiating a guided self-help session;

- executing a diagnostic map on the client computer system;

- during the guided self-help session, using a result of executing the diagnostic map for providing the user with one of the following:

- an option to fix the problem,
- a link to a URL for further diagnosing the problem, and
- an option to search using a system-generated search string;

- at customizable points during the guided self-help session, automatically escalating to live help; and
- automatically providing a support engineer via the server with a data stream summarizing the self-help session.

22. A method for automated technical support in a computer network having a client machine, and a server from which live help is available, comprising:

- in response to entry by a user of a description of a problem with the client machine,

- initiating a guided self-help session;

- executing a diagnostic map on the client machine;

- during the guided self-help session,
- providing the user with an option to escalate to live help; and

- if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session, wherein

- the data stream comprises information produced by executing the diagnostic map on the client computer system.

23. A method for automated technical support in a computer network having a client machine, and a server from which live help is available, comprising:

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- in response to entry by a user of a description of a problem with the client machine,
- initiating a guided self-help session;

- executing a diagnostic map on the client machine;

- during the guided self-help session:

- providing the user with an option to escalate to live help and using a result of executing the diagnostic map for providing an option to execute a fix for the problem on the client machine; and

- if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session.

24. A method for automated technical support in a computer network having a client machine, and a server from which live help is available, comprising:

- in response to entry by a user of a description of a problem with the client machine,
- initiating a guided self-help session;

- executing a diagnostic map on the client computer system;

- during the guided self-help session:

- using a result of executing the diagnostic map for providing the user with an option to escalate to live help and a link to a URL for diagnosing the problem; and

- if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session.

25. A method for automated technical support in a computer network having a client machine, and a server from which live help is available, comprising:

- in response to entry by a user of a problem area and description, initiating a guided self-help session;

- executing a diagnostic map on the client machine;

- during the guided self-help session:

- providing the user with an option to escalate to live help, and

- using a result of executing the diagnostic map for providing the user with a system-generated search string; and

- if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session.

26. A method for automated technical support in a computer network having a client machine, and a server from which live help is available, comprising:

- in response to entry by a user of a description of a problem with the client machine,
- initiating a guided self-help session;

- executing a diagnostic map on the client machine;

- using a result of executing the diagnostic map to provide a selection from the server to the user;

- at customizable points during the guided self-help session,

- providing the user with an option to escalate to live help; and

- if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session.

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27. The method of claim 26 wherein the selection comprises one of the following:

- an option to fix the problem,
- a link to a URL for further diagnosing the problem, and
- an option to search using a system-generated search string.

28. A method for automated technical support in a computer network having a client computer system, and a server from which live help is available, comprising:

- in response to entry by a user of a description of a problem with the client computer system, searching a content database for content related to the problem;

executing a diagnostic map on the client computer system;

using a result of executing the diagnostic map to select relevant content from the content related to the problem, wherein

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the server performs the selecting, and some but not all of the content related to the problem is included in the relevant content;

providing the relevant content to the user;

providing the user with an option to escalate to live help; if the user exercises the option to escalate to live help, automatically providing a support engineer via the server with a data stream summarizing the self-help session.

29. The method of claim 28 wherein the relevant content enables the server to provide one of the following to the user:

- an option to fix the problem,
- a link to a URL for further diagnosing the problem, and
- an option to search using a system-generated search string.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,615,240 B1
DATED : September 2, 2003
INVENTOR(S) : Sullivan et al.

Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,

Item [56], **References Cited**, U.S. PATENT DOCUMENTS, add the following:

-- 5,884,032	3/1999	Bateman et al.....	395/200.34
6,205,579B1	3/2001	Southgate.....	717/11
6,240,420B1	5/2001	Lee.....	707/102
6,279,125B1	8/2001	Klein.....	714/38
6,321,348	11/2001	Kobata.....	714/37 --

Column 3,

Line 28, after "map", please insert -- . --;

Column 4,

Line 21, please delete "an" and insert -- a --;

Line 64, please delete "that" and insert -- and --;

Column 5,

Line 23, after "application", please delete ".";

Line 30, after "Communicator", please delete ".";

Column 7,

Line 12, please delete "includes" and insert -- include --;

Line 39, after "the" please delete ".";

Line 41, please delete "of" and insert -- or --;

Column 8,

Line 13, please delete "if" and insert -- is --;

Line 28, after "step" please insert -- 78 --;

Line 58, after "map" please insert -- . --;

Column 9,

Line 48, after "like" please delete ")";

Column 11,

Line 17, please delete "are" and insert -- is --;

Line 47, please delete "were" and insert -- was --;

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Page 2 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 14,

Line 13, after "of" please insert -- the --.

Signed and Sealed this

Third Day of February, 2004

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looping initial "J" and a distinct "D".

JON W. DUDAS
Acting Director of the United States Patent and Trademark Office